Claims

1. A biologically active complex comprising alpha-lactalbumin or a variant of alpha-lactalbumin (α-lactalbumin) which is in the apo folding state, or a fragment of either of any of these, and a cofactor which stabilises the complex in a biologically active form, provided that any fragment of α-lactalbumin or a variant thereof comprises a region corresponding to the region of α-lactalbumin which forms the interface between the alpha and beta domains, and further provided that when the complex comprises full length α-lactalbumin or a variant of α-lactalbumin in which the calcium binding site has been modified so that the affinity for calcium is reduced, or it is no longer functional, the cofactor is other than C18:1:9 cis fatty acid.

2. A complex according to claim 1 wherein the cofactor is a cis C18:1:9 or C18:1:11 fatty acid or a different fatty acid with a similar configuration.

3. A complex according to claim 1 or claim 2 wherein the cofactor is C18:1:11 fatty acid.

4. A complex according to any one of claims 1 to 3 which comprises a fragment of α-lactalbumin or a variant thereof, which fragment includes a region corresponding to the region of α-lactalbumin which forms the interface between the alpha and beta domains.

5. A biologically active complex according to claim 1 which is obtainable by combining
(i) a cis C18:1:9 or C18:1:11 fatty acid or a different fatty acid with a similar configuration; and
(ii) α-lactalbumin from which calcium ions have been removed, or a variant of α-lactalbumin from which calcium ions have been

removed or which does not have a functional calcium binding site; or a fragment of either of any of these, provided that any fragment comprises a region corresponding to the region of α-lactalbumin which forms the interface between the alpha and beta domains, and further provided that when (ii) is full length α-lactalbumin or a variant of α-lactalbumin in which the calcium binding site has been modified so that the affinity for calcium is reduced, or it is no longer functional, (i) is other than C18:1:9 cis fatty acid.

6. A complex according any one of claims 1 to 5 which includes a variant of α-lactalbumin in which the calcium binding site has been modified so that the affinity for calcium is reduced, or it is no longer functional, and in which the cofactor is C18:1:11 fatty acid..

7. A complex according to claim 6 wherein the variant has a mutation at a position corresponding to at least one of the K79, D82, D84, D87 or D88 residues.

8. A complex according to claim 7 which includes a D87A or D87N variant of α-lactalbumin .

9. A complex according to any one of the preceding claims which comprises a fragment of α-lactalbumin or a variant thereof, and where the fragment includes the entire region from amino acid 34-86 of the native protein.

10. A complex according to any one of the preceding claims wherein the α-lactalbumin is human or bovine α-lactalbumin or a variant of either of these.

11. A complex according to claim 10 wherein the α-lactalbumin is human α-lactalbumin.

12. A complex according to claim 11 wherein the α-lactalbumin is mutant bovine α-lactalbumin which includes an S70R mutation.

13. A complex according to any one of the preceding claims which further comprises calcium ions.

14. A pharmaceutical composition comprising a complex according to any one of the preceding claims in combination with a pharmaceutically acceptable carrier.

15. A method for treating cancer which comprises administering to cancer cells a complex according to any one of claims 1 to 13 or a composition according to claim 14.

16. A method for treating bacterial infections which comprises administering to a patient in need thereof, a complex or a composition as described above.